Adolescent and young adult substance use in Australian Indigenous communities: a systematic review of demand control program outcomes

Lynore Geia,[1] Kirstie Broadfield,[1] Daniel Grainger,[1] Andrew Day,[1] Felecia Watkin-Lui [1]

Abstract

Objective: Identifying preventative approaches to substance use in Indigenous communities is the foundation for developing evidence-based responses. This study reports the findings of a systematic review of the published literature evaluating the impact of substance use programs on Australian Indigenous youth.

Methods: Evidence about the impact of substance use programs for Indigenous young people was identified from a systematic review of the literature conducted according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses guidelines.

Results: Only four original studies that met the inclusion criteria were identified, although a further 19 papers that described characteristics of programs that may be associated with improved outcomes were reviewed.

Conclusions: Evidence relevant to the outcomes of demand control programs that target Australian Indigenous youth substance use is both weak and inconsistent. There is a need to support the type of evaluation activity required to better understand program effectiveness and build the Indigenous knowledge base.

Implications for public health: These findings are discussed in relation to the development of evidence-based practice and the type of knowledge that is likely to be of most use to those seeking to address problems associated with youth substance use.

Key words: Indigenous, substance use, programs, systematic review

Adolescence and young adulthood is widely thought to be a key developmental period that is typically characterised by a series of life transitions, such as leaving the compulsory educational system and entering employment. Young people often have greater freedom and less social control than they experienced during childhood and the risk of substance use and misuse increases significantly.[1] This appears to be a particular issue in Indigenous communities, with one review by Gray and Wilkes[2] concluding that the rate of risky consumption of alcohol and other drugs was generally double than that observed in the non-Indigenous population. For example, their study reported that a smaller proportion of non-Indigenous Australians disclosed recent use of cannabis (11%) or amphetamine-type stimulants (3%) than Indigenous Australians, who reported rates of 22% and 7%, respectively.

In Australia, efforts to address harm related to substance use are positioned through the National Aboriginal and Torres Strait Islander Peoples' Drug Strategy 2014–2019.[3] The strategy offers a framework for supporting interventions that aim to reduce *supply* (e.g. price controls, trading hours, outlet density, dry community declarations, local dry area alcohol bans, liquor licensing accords, controls on the availability of volatile substances); *demand* (e.g. early intervention, alternatives to substance use, education and persuasion, treatment, diversion to treatment, ongoing care); and *harm reduction* (e.g. community patrols and sobering-up shelters, needle and syringe programs). However, our focus in this study is on the status of evidence relating solely to demand control initiatives; those programs and interventions that might be offered directly to Indigenous adolescents and young adults. The study arose as the result of an ongoing collaboration between Palm Island Aboriginal community members with local Aboriginal Community Controlled Health Organisations and the higher education sector.

Palm Island, also known as Bwgcolman Country, is a discrete Aboriginal and Torres Strait Islander community situated 65 kilometres north-west of Townsville on the east coast of Queensland, Australia. Home to the Bwgcolman and Manbarra people, it is a community of approximately 3,000 people, where 53% of the population are under the age of 24 years. The first author of this study is a Palm Island woman, a member of the community, health professional and researcher. She is currently working in a research collaboration project on Palm Island with the local alcohol and drug rehabilitation organisation and other health organisations.

In 2016, young people aged 14–24 years old were invited to participate in a survey that

* *The term Indigenous is used respectfully in this paper to refer to the Aboriginal and Torres Strait Islander peoples of Australia.*

1. Indigenous Education and Research Centre, James Cook University, Queensland
Correspondence to: Professor Andrew Day, Indigenous Education and Research Centre, James Cook University, James Cook Drive, Townsville, Queensland 4811; e-mail: Andrew.day@jcu.edu.au
Submitted: September 2017; Revision requested: January 2018; Accepted: March 2018
The authors have stated they have no conflict of interest.

Aust NZ J Public Health. 2018; 42:254-61; doi: 10.1111/1753-6405.12789

asked about current substance use, with their responses indicating relatively high levels of alcohol and marijuana use and low use of volatile substances.[4] This has prompted discussion about the types of demand control programs for youth that might be best suited to address the issue in the community context.

Knowledge about the differential impact of the wide range of substance use programs that have been developed is likely to be critical to any informed decision about which ones to support or invest in. A recent US Department of Health and Human Services (2016) review noted, for example, that while many communities are concerned about the impact of substance use on adolescents and young adults, it is not uncommon for them to implement prevention programs and strategies that have little or no evidence of effectiveness.[5] Nonetheless, there is general agreement that expanding access to effective, evidence-based treatments for those with substance use problems will be critical, especially when these are offered in conjunction with broader prevention programs and policies. From a public health perspective, the way forward seems clear. First, review the range of possible demand reduction programs for adolescents and young adults that are available. Then identify those that have been shown to be the most effective and make these available to policy makers and communities alike for discussion about how they might be tailored to the local context. The most promising can then be implemented and further evaluated.

The Blueprints for Healthy Youth Development[6] (www.blueprintsprograms.com) is an example of just this sort of approach. It provides a registry of evidence-based positive youth development programs designed to promote the health and wellbeing of children and adolescents across the family, school and community-based domains. Programs are also classified in relation to three levels of prevention: *universal* interventions aimed at all members of a given population; *selective* interventions for a subgroup determined to be at high risk; and *indicated* interventions targeted to individuals who are already identified as having a problem. Communities can then choose from these three types of intervention, although we note that evidence about the optimal balance of programs across these levels is often lacking (e.g. whether it is better to service a larger number of people who are considered to be at a low risk or a smaller number who are at high risk). In Australia, a similar approach is being developed by the Australian Institute of Family Studies[7] (https://aifs.gov.au/cfca/about-child-family-community-australia), which provides evidence-based information for professionals in the child, family and community welfare sectors, including the identification of programs that may then be eligible for Commonwealth funding.

It is immediately apparent that significant challenges arise in any attempt to apply this type of approach across different cultural settings. Evidence of program effectiveness for Indigenous youth is not easy to access, and there have been surprisingly few published reviews of program outcomes relevant to this topic. At the same time, Gray and Wilkes[2] have argued (in relation to interventions for adults) that "while there is a need for more current data and evaluation of interventions, there is ample evidence to show what can be done to reduce AOD-related harm among Indigenous Australians".[2(p10)] This, of course, raises key questions about the validity of any evidence that is put forward to support the implementation of a particular program. Indeed, in the Indigenous context, the application of evidence-based policy and practice has become a contentious issue, leading to ongoing discussion about what constitutes evidence, how to prioritise different types of data, and which methodological paradigms should be privileged.[8] Critics of the public health approach have argued, for example, that there is a need for alternative approaches based on local-level data and perspectives as, in their view, the context or environment in which programs are developed is inevitably of paramount importance.[9] These are, however, more than academic discussions about research design and methodology, given that any application of evidence-based public policy pre-supposes that there is shared understanding between those who collect data and those who might be expected to use it. In other words, it is assumed that any data being collected will be theoretically informed and relevant to both understanding the problem and the development of any associated intervention. And yet different understandings between academic researchers from outside the community and those who are in the community about the aetiology and functions of the target behaviour (in this case substance use in Indigenous young people) will inevitably influence judgements about the 'cultural appropriateness' of any interventions that follow. More broadly, while it is clear that many aspects of programs (and the underpinning policy) can be successfully transferred from one setting to another, this is not always the case.[10] This may be because the transfer is uninformed (insufficient knowledge of the original program and how it operates) or incomplete (not all of the crucial elements of the program are transferred), or simply because the transferred program was inappropriate to its new economic, social, political and ideological conditions.

In an effort to further discussions with the community on Palm Island about how to identify and implement the most effective programs, the aim of this study is to review the strength and validity of current research evidence relevant to judgements about which interventions are most likely to lead to meaningful reductions in adolescent and young adult substance use. In our view, it is this type of information, and clarity about its limitations and validity, that can directly assist communities to determine which approaches have the best chances of success in the local setting. This study, however, only seeks to identify a subset of this evidence, as reported in the peer-reviewed research literature.

Method

Evidence about the impact of substance use programs for Australian Indigenous adolescents and young adults was identified from a systematic review of the literature conducted according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines.[11] Searches of the most relevant databases (Cinahl, Informit, Medline OVID, PyschArticle, PsychInfo, PubMed, AcademicOneFile, Cochrane Library, Emerald Insight, Google Scholar, JSTOR, Prospero, Sage, Scopus, Taylor and Francis, Web of Science, Wiley Online Library, and Worldcat) were conducted between March and July 2017.

The search terms used, identified after consultation with a professional librarian, were "aboriginal Australian" OR "Australian indigenous" AND (substance OR drug OR alcohol) AND (abuse OR misuse) AND (adolescent OR "young adult" OR youth) AND (program OR rehabilitation OR rehabilitation

OR treatment OR intervention OR education). Original articles were included in the review if: i) they described an evaluation or outcome study conducted in Australia in the past 20 years; ii) they were peer reviewed; iii) they were written in the English language; and iv) the full text was accessible. The decision to use only broad descriptors of interventions (e.g. 'program') and the age group (e.g. 'adolescent') was intentional, so as to be inclusive as possible of relevant studies.

A total of 367 records were initially identified. These were then classified using the PRISMA model (Figure 1). Following the removal of 82 duplicates (given the number of different databases searched) and 238 studies that did not pass initial eligibility screening, the titles and abstracts of 47 articles were then reviewed manually to determine if they met the study inclusion criteria. Only four studies, however, fully met the inclusion criteria. The number of published articles on this topic in peer-reviewed, high-impact journals is strikingly low.

Results

A summary of the findings of each of the identified studies is contained within Table 1. The first, by Jainullabudeen et al.[12] described the impact of a risky drinking intervention ('Beat da Binge') in Queensland. A key feature of this program was that it was "community-driven, utilised participatory approaches, actively engaged young people in its design implementation and evaluation, and sought to create a partnership with researchers" (p. 3). The program activities were described in terms of three areas of activity: raising awareness of safe drinking practices; promoting enjoyable alcohol-free activities as alternatives to alcohol inclusive events; and diversionary activities to alleviate boredom and motivate achievement and self-empowerment. Approximately 1,880 people were reported to have participated and community awareness of the program was high (78% of people who responded to a post-intervention survey had heard of the project). The evaluation reported a self-reported reduction in binge drinking, as well as a reduction in the frequency of binges. In addition, a reduction in the number of people who reported attending activities with family or friends where alcohol was involved was noted. Awareness of short-term risks of drinking and knowledge about standard drinks also increased. For the authors of this study, the program demonstrated "that locally developed interventions can be potentially effective, and that encouraging partnerships between Indigenous communities and researchers to evaluate community-led intervention is feasible" (p. 6).

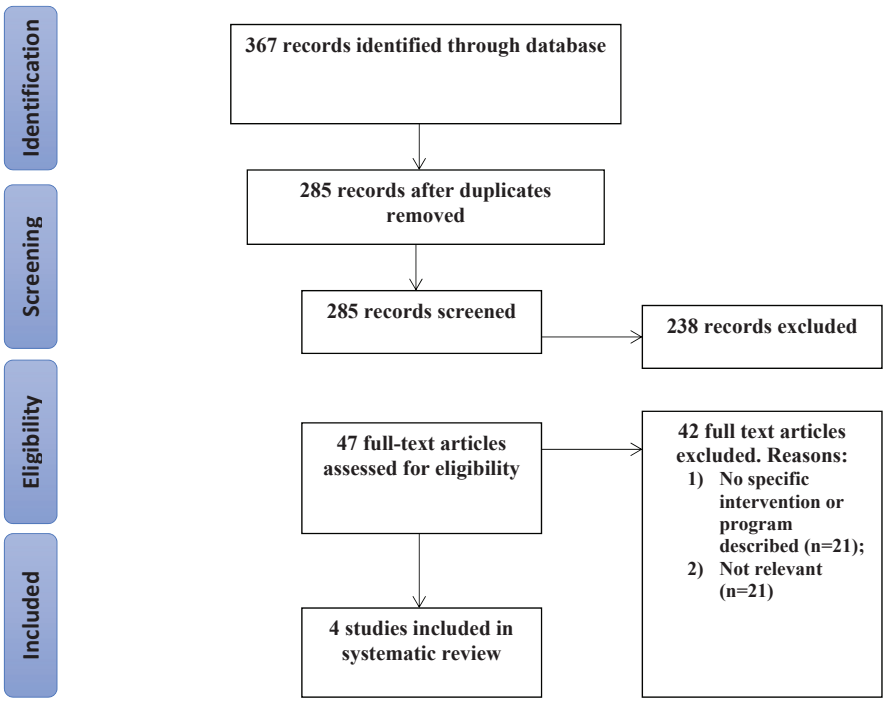
The other studies identified in this review were all concerned with reducing volatile solvent abuse (primarily petrol and paint sniffing) in the Northern Territory and Queensland. The first of these, by Campbell and Stojanovski,[13] involved an elders program.The second by Dingwall, Maruff, Clough, and Cairney[14] evaluated a treatment program and the third, by Butt,[15] a diversionary activities program. These are described briefly next.

Campbell and Stojanovski evaluated the Mount Theo Petrol Sniffing Program, which began in 1994 when more than 70 young people ("approximately half of the young people at Yuendumu" [p. 1]) were thought to be sniffing petrol.[13] For the authors of this study, one of the primary elements of this program was that it took place 50 kilometres away from the nearest main road ("too far for the kids to run away" p. 2); however, the program operator saw the adoption of a "positive emotional and physical health strategy" as key. This involved teaching the youth about country and the Jukurrpa (dreaming or dreamtime), as well as involving them in activities at Mt Theo station, such as "hunting for bush tucker, day trips from the station, and occasional visits from CDEP and educational instructors" (p. 2). In addition to the Mt Theo outstation, a Youth Program was also run at Yuendumu where the primary activity was participation in the Tanami Football League. In 1998, 29 people were reported to have stopped petrol sniffing after staying at Mt Theo, and an additional 18 people after participation in the Youth Program.

Dingwall et al. evaluated an intervention that included a rehabilitation centre and a remote outstation.[14] The key elements of the centre's program were "drug education and goal planning sessions, life skills (e.g., health, hygiene, budgeting, nutrition) sessions and recreational sessions, including cultural activities" (p. 41), and the outstation program was run along similar lines with the addition of "practical pastoral activities" (p. 41). Of the 45 participants in the program, 26 were reported to have relapsed and 19 abstained. However, 34 of the 45 people who re-assessed were thought to still be using cannabis, alcohol, or both.

The Queensland diversionary program, evaluated by Butt included activities such as go-karting, deep sea fishing, cultural dance events, and a health check.[15] Participants were expected to engage with at least one activity (the average was three activities), and all of the activities included education-

Figure 1: Systematic review search methodology.



based components about addiction. More than half of those who started the program were still involved at the end, although some had dropped out and returned later. Two participants, who met the criteria for clinical substance use disorders at the first assessment, no longer met the criteria at the second assessment. In addition, 56.6% were reported to have ceased using substances at the end of the evaluation, with the proportion of those still using reducing (from 56.3% daily use to 16.7%, from 12.5% a few times a month to 5.6%, from 6.3% a few times a week to 5.6%). Of the 18.8% who had never used solvents before, 7.7% began using, although how many of these made up the experimental numbers was unclear.

In addition to these studies that met the inclusion criteria for this review by reporting program outcomes for Indigenous youth, a further 19 were identified as providing potentially relevant information about programs. These are outlined in Table 2. Although they do not directly report change in Indigenous youth substance use, they do offer some information that is relevant to understanding what constitutes effective practice in this area and so are briefly described below.

The first group of these papers talk generally about substance use and how it, and service delivery, might best be conceptualised. For example, Jayaraj et al.[16] proposed preventative health care approaches to mitigate alcohol-related trauma in Indigenous Australian communities, which included enforced harm-prevention policies, awareness campaigns, and the development of "brief" and "broad" care settings. Gray and Saggers'[17] book presented a wide range of research on Indigenous Australian drug and alcohol abuse. Its purpose was to enhance informed (intervention) decision-making in Indigenous communities and the authors identify the need for university research on interventions to be made more accessible to community based practitioners. It followed Gray et al.'s[18] systematic review of evaluation reports on Aboriginal Australian alcohol interventions that identified the need to sufficiently resource intervention programs and expand the range of intervention options. Purdie et al.'s[19] book, written in response to a perceived lack of alignment of mental health models with Indigenous Australian cultures, also provided a substance supply–demand framework to guide practitioners. Wilson et al.[20] surveyed Indigenous Australian alcohol misuse, its structural and historical determinants and the effectiveness of interventions to date. A key

Table 1: Summary of reviewed studies.

No	Citation (State)	Participants	Intervention	Study design	Outcome measure	Summary of findings
1	Jainullabudeen, T. A., Lively, A., Singleton, M., Shakeshaft, A., Tsey, K., McCalman, J., Doran, C., & Jacups, S. (2015). The impact of a community-based risk drinking intervention ('Beat da Binge') on Indigenous young people. *BMC Public Health*, 15(1319), 2-7. DOI 10.1186/s12889-015-2675-4. (Queensland)	1,880 59% of 18–25 year-old youths in the community participated in the baseline survey	Two-year project targeting binge drinking. Key features: - community driven	Cross sectional, baseline-post intervention study. Baseline and two years post intervention. Survey used snowballing techniques	Reduction of binge drinking and increase in awareness and involvement in alcohol-free events.	Statistically significant increases in awareness of binge drinking and standard drinks (28% and 21% respectively). 10% reduction in episodes of short-term risky drinking, in the frequency of short-term risky drinking for all beverage types except wine.
2	Campbell, L., & Stojanovski, A. (2001). Walpiri Elders Work with Petrol Sniffers. *Indigenous Law Bulletin*, 5(9). (Northern Territory)	"young people" Mt Theo: n=45 Youth Program: n=18	Stay at an outstation. Involvement with activities on the outstation including: hunting for bush tucker, day trips from the outstation, and occasional visits from CDEP and educational instructors. Sport and recreational activities as alternative to petrol sniffing.	Not detailed.	Reduction of petrol sniffing.	29 people stopped petrol sniffing after staying at Mt Theo. 18 people stopped petrol sniffing after involvement with Youth Program. 47 people in total stopping sniffing petrol.
3	Dingwall, K., Maruff, P., Clough, A. R., & Cairney, S. (2012). Factors associated with continued solvent use in Indigenous petrol sniffers following treatment. *Drug and Alcohol Review*, 31, 40-46. DOI: 10.1111/j.1465-3362.2010.00279.x (Northern Territory)	Average mean age 18 years; n=56	Rehabilitation centres and a remote outstation. Education, goal planning, life skills, recreation and cultural activities.	Baseline of 11 days from admission to treatment - demographic and substance use questionnaires and psychological and cognitive assessment. After 9 months of treatment, 21 re-assessed in their home communities. In addition, interviewed three key informants (community health worker, family member, etc.). Follow up interviews.	Reduction of substance abuse.	Of 52, 45 reassessed. 26 had relapsed and 19 had abstained. 34 were using cannabis, alcohol or both at follow up.
4	Butt, J. (2004). *Summary of findings from the Get Real Challenge Evaluation: Issues facing Indigenous youth who misuse volatile substances, and outcomes of a program targeting these issues.* Brisbane, Australia: UniQuest and Brisbane City Council. (Queensland)	24 12 to 18 with average age of 15.5	Diversionary activities included go karting, deep sea fishing, cultural dance events, and young person's health check.	Level of involvement in activities was measured and the status of individuals was classified at the end of evaluation. 6 underwent two psychosocial assessments, and 18 were assessed by staff at intake and at end of evaluation. Assessments included ongoing involvement, and those no longer involved. Questionnaire to follow up.	Reduction of Volatile Substance Use, or No VSU for those never having used (21%).	From 56.3% using daily to 16.7% using daily. 55.6% quit using. Overall, there was a decrease in substance use in all categories, except Never, which went from 18.8% to 11.1%. At initial assessment, 2 participants were diagnosed as ICD-10 for harmful use, and 1 for substance dependence; at second assessment no one met diagnosis criteria.

finding of their study was the need to build capacity in Indigenous organisations and coordinate mainstream intervention offerings with community activities. They argued that single interventions should be part of a portfolio of interventions, rather than stand alone. Similarly, MacLean and D'Abbs[21] and the Select Committee submission by D'Abbs and MacLean[22] reviewed Australian Aboriginal petrol sniffing interventions. They concluded that single-measure strategies did not have sufficient evidence to be considered effective (although, in part, this was a result of the lack of evaluation). Bohanna et al.[23] also proposed a preventative drug intervention protocol for Indigenous Australian youth. Prominent in their proposal was the need to collect baseline data to facilitate periodic evaluation of outcomes. MacLean et al.'s systematic review[24] of international substance misuse interventions also called

Table 2: Other relevant studies.

	Citation	Notes
1	McCalman, J., Tsey, K., Weniton, M., Whiteside, M., Haswell, M., Cadet James, Y., & Wilson, A. (2006). *A literature review for Indigenous men's groups*. Cairns, Australia: James Cook University.	Although it does not contain specific studies, it does list a number of interventions that could be adaptable for either a men's group or a youth group. It also includes guidelines for alcohol interventions.
2	Gray, D., & Saggers, S. (Eds.). (2002). *Indigenous Australian alcohol and other drug issues: Research from the National Drug Research Institute*. Perth, Australia: National Drug Research Institute.	Collection of journal articles and book chapters that provide a narrative-based review of interventions, including cultural appropriateness, and protocols/guidelines for implementing interventions.
3	Wilson, M., Stearne, A., Gray, D., & Saggers, S. (2010). Review of the harmful use of alcohol amongst Indigenous Australians. *Australian Indigenous Health Reviews*, 4. [cited 2018 Apr 9] Available from: http://www.healthinfonet.ecu.edu.au/uploads/docs/alcohol-review.pdf	A narrative-based paper detailing interventions, as well as protocols for effective implementation.
4	Pembroke, F., Dinan-Thompson, M., Sellwood, J., & Australian Association for Research in Education (AARE). (2005). *A kickstart to life for Indigenous youth*. Paper presented at the Conference (2004: Melbourne Vic). [cited 2018 Apr 9] Available from: www.researchgate.com.au	Although this paper does not reference a program that is substance abuse specific, it is of interest for adolescents and young people in terms of prevention/diversion.
5	Mohajer, N., Bessarab, D., & Earnest, J. (2009). There should be more help out here! A qualitative study of the needs of Aboriginal adolescents in rural Australia. *Rural and Remote Health*, 9 (1137), [cited 2018 Apr 9] Available from: www.rrh.org.au	This article contains key actor-based information regarding the potential design of a quality culturally-appropriate intervention / program.
6	Bohanna, I., Bird, K., Copeland, J., Roberts, N., & Clough, A. (2014). A service-level action research intervention to improve identification and treatment of cannabis and related mental health issues in Youth Indigenous Australians: A study protocol. *BMJ Open*, 4. DOI: 10.1136/bmjopen-2014-005689.	This details a proposed service-level action research intervention and evaluation.
7	Hart, L.M., Bourchier, S.J., Jorm, A.F., Kanowski, L.G., Kingston, A.H., Stanley, D., & Lubman, D.I. (2010). Development of mental health first aid guidelines for Aboriginal and Torres Strait Islander people experiencing problems with substance use: A Delphi study. *BMC Psychiatry*, 10(78), 1-10.	The information obtained from the Aboriginal health experts may be of use when developing or implementing a program.
8	Jayaraj, R., Thomas, M., Thomson, V., Griffin, C., Mayo, L., Whitty, M, d'Abbs, P., & Nagel, T. (2012). High risk alcohol-related trauma among the Aboriginal and Torres Strait Islanders in the Northern Territory. *Substance Abuse Treatment, Prevention, and Policy*, 7(33), 2-5.	This article contains useful information on culturally appropriate prevention, but no specific evidence-based program evaluation.
9	MacLean, S.J., & d'Abbs, P. H.N. (2002). Petrol Sniffing in Aboriginal communities: A review of interventions. *Drug and Alcohol Review*, 21, 65-72. DOI: 10.1080/09595230220119345.	No specific evaluation data, but a useful overall review of interventions.
10	Trees, K. (2015). Mobile media: Communicating with and by Indigenous youth about alcohol. *Australian Aboriginal Studies*, 1, 97-106.	No specific program evaluation, but a useful insight into using mobile technology within an intervention program for youth.
11	d'Abbs, P., & MacLean, S. (2002). Petrol Sniffing in Aboriginal communities: A review of interventions. Tabled at the select committee on substance abuse in the community, 21st June 2002.	An expansion on article number 9 in this list.
12	Preuss, K., & Napanangka Brown, J. (2006). Stopping petrol sniffing in remote Aboriginal Australia: Key elements of the Mt Theo Program. *Drug and Alcohol Review*, 25, 189-193. DOI: 10.1080/09595230600644640.	Provides descriptive background information to the Mt Theo Program.
13	MacLean, S., Cameron, J., Harney, A., & Lee, N. K. (2012). Psychosocial therapeutic interventions for volatile substance use: A systematic review. *Addiction*, 107, 278-288. DOI:10.1111/j.1360-0443.2011.03650.x	This paper looked at international programs, including Australia. Although no specific Australian study was investigated, the review turned up studies for possible further exploration.
14	Calabria, B., Clifford, A., Rose, M., & Shakeshaft, A.P. (2014). Tailoring a family-based alcohol intervention for Aboriginal Australians, and the experiences and perceptions of health care providers trained in its delivery. *BMC Public Health*, 14(322), 1-10.	Although this article contained no specific evaluation data it contains information on the possibility of adapting CRA/CRAFT programs for Indigenous Australian families.
15	McCalman, J., Tsey, K., Bainbridge, R., Shakeshaft, A., Singleton, M., & Doran, C. (2013). Tailoring a response to youth binge drinking in an Aboriginal Australian Community: A grounded theory study. *BMC Public Health*, 13(726), 1-9.	Although this article contains no specific evaluation data, it details a theoretical model, which supports information from the Beat Da Binge program cited in Table 1.
16	Taylor, K., Thompson, S., & Davis, R. (2010). Delivering culturally appropriate residential rehabilitation for urban Indigenous Australians. *Aust and NZ Journal of Public Health*, 34(S1), 36-40. DOI: 10.1111/j.1753-6405.2010.00551.x	Although this article does not contain specific evaluation data it does detail cultural best practice in terms of residential rehabilitation.
17	Gray, D., Saggers, S., Sputore, B., & Bourbon, D. (2000). What works? A review of evaluated alcohol misuse interventions among Aboriginal Australians. *Addiction*, 95(1), 11-22. DOI: 10.1046/j.1360-0443.2000.951113.x	A review of evaluated interventions; however, not enough qualitative information. Studies mentioned may be useful for further review.
18	Purdie, N., Dudgeon, P., & Walker, R. (Eds.), *Working together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice*. Canberra, Australia: Commonwealth of Australia.	Chapter 9 may have some useful references and discusses cultural relevance. Part 4: Working with specific groups may have some information regarding culturally safe practice.
19	Polsen, M., & Chiauzzi, A. (2003, July). *Volatile substance use in Mount Isa: Community solutions to a community identified issue*. In Inhalant Use and Disorder Conference (pp. 7-8). (Queensland).	This paper reports the outcomes of a 12-week pilot program involving 9 Indigenous participants using semi-structured and in-depth interviews at baseline, midpoint, and endpoint. The program had many cultural design aspects including the use of mentors, 'cultural awareness', stories, family case-management, and education / youth service involvement, and a focus on life-skills and all male participants were reported to have ceased inhalant use.

for the further development and validation of evaluation tools to improve reliable and coherent measurement.

A number of papers have also described more specific strategies and programs. For example, McCalman et al.[25] reviewed an Indigenous Australian men's health program that included alcohol management activities. They identified alcohol abuse as hindering the intergenerational transmission of culture, as well as discussing the use of compulsory interventions. A McCalman et al. study[26] focused on reframing Indigenous Australian community-based service provision addressing binge drinking to one of considering the goals and purpose of the individual. The study resulted in a shift in focus from a social marketing campaign mode to one of youth mentoring aligned with education and employment. Polsen and Chiauzzi[27] evaluated a community-driven program in Mount Isa, Queensland. Although this program did not specifically focus on Indigenous youth, the nine participants all identified as Indigenous. This was a twelve-week pilot program, which included the use of mentors, cultural awareness activities, family case management, and education/youth services with a focus on life skills. Although this study met our inclusion criteria, the program was not designed to explicitly focus on substance use (although this was a goal), but to work with life situations and family concerns. The bush camps were viewed as a key opportunity to "detox the young people" (p. 6), as well as to foster cultural connections. They were described as providing a safe area to discuss problems and build rapport with mentors. One camp was described by attending staff as: "… a significant life changing experience for the young people … and reinforcement that they are valued and loved in the community" (p. 6). An 18-month follow-up reported that all male participants (number not known) had ceased inhalant use and were participating in representative football, although female participants were still occasionally inhaling and "proving difficult to progress" (p. 9).

Taylor et al.[28] reviewed the alcohol intervention preferences of urban Indigenous Australians. The key finding from this study was that residential intervention and treatment was preferred to mainstream approaches (typically non-residential in format). In addition, increased coordination between Indigenous and mainstream service deliverers was encouraged.

The study by Pembroke et al.[29] considered the effectiveness of a sporting program on Indigenous youth behaviour, which included alcohol abuse. The program was found to effectively prevent adverse behaviour, but once again the importance of ties to the community was identified as key to ensuring sustainable positive outcomes. Trees[30] reviewed an alcohol awareness campaign for youth that was implemented by an Australian Aboriginal Community Organisation. Inclusion of youth from the campaign design stage was found to be important in identifying the best mode to convey the message (e.g. mobile and social media were identified as highly effective).

Mohajer et al.[31] argued that family-based and peer support group intervention approaches supported by experts were likely to be most effective. A more recent paper by Calabria et al.[32] supports this suggestion by proposing improvements to an alcohol misuse intervention program with an Indigenous Australian family support focus. An important finding of their study was that overly technical language presented a barrier to effective intervention. In addition, a certification process was considered paramount to building confidence in practitioners. For Preuss and Napanangka-Brown,[33] who reviewed the successful petrol sniffing intervention in Yuendumu, Australia, service delivery by local Indigenous organisations optionally supported by external experts was important, as was the inclusion of an outstation-youth program. Finally, Hart et al.[34] suggested the implementation of an Indigenous Australian culturally appropriate mental health first aid approach that directly addresses problem drinking and problem drug use.

Discussion

Knowledge about those programs that are known to lead to measurable reductions in substance use is useful for both policy makers who are asked to decide where to channel resources, and to communities, who need to consider which programs have the most potential to address identified problems in their local context. As Thomson et al.[35(p1)] have argued: " … access to the best, up-to-date knowledge and information is being increasingly recognised as crucial to bridging the gap between what is known and what is actually being done".

The aim of this systematic review was to synthesise the body of published research that documents the outcomes of programs that have the demonstrated potential to reduce youth substance use in Indigenous communities. The most striking finding is that, despite there being substantial literature on substance use programs, only four evaluation studies of Australian Indigenous youth programs were identified using our search terms as having been published in the past 20 years. When these are considered in terms of their diversity (one was concerned with alcohol, the others with petrol sniffing; one was conducted in Queensland, the others in the Northern Territory) and what is known about their impact on key indicators of substance use (including self-reported substance use), the limitations of the current evidence base become very apparent. In addition, none of these evaluations used research designs that would allow their findings to be described as contributing to evidence-based practice,[36] and it is not possible to aggregate their results in any way that allows general statements about effective practice to be made. This is not, however, to suggest that the list of identified studies is exhaustive. We are aware, for example, of one earlier study that is relevant to our research question by Burns, Currie, Clough, and Wuridjal,[37] which was not identified in the search strategy because the title of the study did not specify that participants were young people, and because the study was published more than 20 years ago.This is a limitation of any systematic review methodology and there will inevitably be other potentially relevant studies that were not included.

The larger body of work we identified discusses program delivery more generally and does contain information that is potentially relevant to program development. It is difficult (on the basis of this evidence) to disagree with the conclusion of Gray and Wilkes[2(p10)] that "interventions should be initiated by, or negotiated with, local communities and implemented in ways that are culturally safe". It is also our reading of these studies that interventions are likely to be more effective if delivered by Indigenous community-controlled organisations, and that they need to be given support to develop the capacity to do so and take full control within an agreed timeframe.

It is important to be clear about the scope of this review and to return to the specific

inclusion criteria that were applied to the searches of relevant research databases. The small number of papers that met our criteria should not be interpreted as evidence that programs aiming to address youth substance abuse in Indigenous communities are scarce. In fact, The Australian Indigenous Alcohol and other Drugs Knowledge Centre website (www.aodknowledgecentre.net.au) provides links to a wide range of different health promotion and health practice resources that may be of interest to communities.[38] Rather, our observation here is that there is simply an absence of published evidence relating to their outcomes. It is also important to acknowledge that some programs may not be ready for evaluation, or may be inadequately funded, highlighting the need to better understand the broader drivers of effective program delivery, such as the need for self-determination and to consider local cultural context. Indeed, a wide range of implementation issues (such as the extent to which communities are consulted, the quality of program delivery, the relevance of the program to local needs, the impact of a program on community capacity building, and issues relating to cost and sustainability) need to be addressed before outcome evaluation becomes possible. Nonetheless, it is still surprising that such limited evidence about effective programming is available in an area such as youth substance use that attracts so much community concern.

Returning to the earlier discussion about the potential utility of the public health approach to program selection, it is clear from this study that this will inevitably rely on the availability of valid data about change – of the type that is simply not available. It is difficult to disagree with the arguments presented by both MacLean et al.[24] and Bohanna et al.[23] that it is only possible to establish program outcomes when valid and reliable tools are used to assess need, and that baseline data is required to document the extent to which change over time occurs. Even in contexts where randomised intervention trials are not feasible, there is clearly work to be done developing approaches to measurement that have utility in community settings. We also see the need for caution in any efforts to articulate what might represent an ideal intervention (or 'best practice') that others should strive to emulate. Our view is that the goal of any intervention efforts in this area should be to address the needs of its participants by taking their specific attributes and the circumstances under which the program is to be delivered into account. For the Palm Island community, this will involve developing an agreed understanding of the causes and functions of substance use, so that interventions can address both. For example, links between socioeconomic disadvantage and risk of dependence on alcohol, nicotine and other drugs have been reasonably well documented,[39] and may be relevant to the choice of any intervention strategy.

In conclusion, this paper provides a contemporary review of evidence relevant to the selection of demand control programs that target Indigenous youth and young adult substance use. We see this as foundational information that can be incorporated into ongoing discussion about both the type of interventions that are likely to be most effective in a particular community, as well as the type of evaluation activity that is required to understand program effectiveness. Clearly, there is much work to be done.

References

1. White V, Bariola E. *Australian secondary School Students' Use of Tobacco, Alcohol, and Over-the-counter and Illicit Substances in 2011* [Internet]. Canberra (AUST): Australian Government Department of Health and Ageing Drug Strategy Branch; 2012 [cited 2017 Jul 2]. Available from: http://www.nationaldrugstrategy.gov.au/internet/drugstrategy/Publishing.nsf/content/school11
2. Gray D, Wilkes E. *Reducing Alcohol and Other Drug Related Harm*. Resource Sheet No.: 3. Canberra (AUST): Closing the Gap Clearinghouse; 2010.
3. Intergovernmental Committee on Drugs. *National Aboriginal and Torres Strait Islander Peoples' Drug Strategy 2014-2019: A Sub-strategy of the National Drug Strategy 2010-2015* [Internet]. Canberra (AUST): Australian Government Department of Health and Ageing Drug Strategy Branch; 2015 [cited 2017 Mar 30]. Available from: http://www.nationaldrugstrategy.gov.au/internet/drugstrategy/Publishing.nsf/content/natsipds2014-19
4. Geia L, Lindsay D. Towards an Indigenous youth led strategy: Building research capacity in vulnerable youth. *Proceedings of the 14th National Rural Health Conference* [Internet]; 2017 Apr 26-29; Cairns, Australia; 2017 [cited 2017 Aug 17]. Available from: http://www.ruralhealth.org.au/14nrhc/content/geia
5. Office of the Surgeon General. *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health*. Washington (DC): United States of America Department of Health and Human Service; 2016.
6. Blueprints for Healthy Young Development. Program Search. *Blueprints Programs = Positive Youth Development* [Internet]. Boulder (CO): University of Colorado Boulder Institute of Behavioral Science Center for the Study and Prevention of Violence; 2017 [cited Jul 1]. Available from: http://www.blueprintsprograms.com/search
7. Australian Institute of Family Services. *Child Family Community Australia* [Internet]. Canberra (AUST): Government of Australia; 2017 [cited 2017 Aug 21]. Available from: https://aifs.gov.au/cfca/about-child-family-community-australia
8. Dudgeon P, Scrine C, Cox A, Walker R. Facilitating empowerment and self-determination through participatory action research: Findings from the National Empowerment Project. *Int J Qual Methods*. 2017;16:1-11.
9. Hope T. Pretend it doesn't work: The 'anti-social' bias in the Maryland Scientific Methods Scale. *Eur J Crim Pol Res*. 2005;11:275–96.
10. Lewig K, Arney F, Scott S. Closing the research-policy and research -practice gaps: Ideas for child and family services. *Fam Matters*. 2006;74:12–19.
11. Moher D, Liberati A, Tetzlaff J, Altman D. Preferred reporting items for systemic reviews and meta-analyses: The PRISMA statement. *BMJ*. 2009;339(b2535):332-6.
12. Jainullabudeen TA, Lively A, Singleton M, et al. The impact of a community-based risk drinking intervention ('Beat da Binge') on Indigenous young people. *BMC Public Health*. 2015;15(1319):2-7.
13. Campbell L, Stojanovski A. Warlpiri Elders work with petrol sniffers. *IndigLawB*. 2001;46;5:9.
14. Dingwall K, Maruff P, Clough A, Cairney S. Factors associated with continued solvent use in Indigenous petrol sniffers following treatment. *Drug Alcohol Rev*. 2012;31(1): 40-6.
15. Butt J. *Summary of Findings from the Get Real Challenge Evaluation: Issues Facing Indigenous Youth Who Misuse Volatile Substances, and Outcomes of a Program Targeting these Issues* [Internet]. Mt Lawley (AUST): Edith Cowan University Australian Indigenous HealthInfoNet; 2004 [cited 2017 Jul 4]. Available from: http://www.healthinfonet.ecu.edu.au/uploads/resources/3510_grc_summaryevaluationreport.pdf
16. Jayaraj R, Thomas M, Thomson V, et al. High risk alcohol-related trauma among the Aboriginal and Torres Strait Islanders in the Northern Territory. *Subst Abuse Treat Prev Policy*. 2012;7(33):2-5.
17. Gray D, Saggers S. *Indigenous Australian Alcohol and Other Drug Issues: Research from the National Drug Research Institute* [Internet]. Perth (AUST): National Drug Research Institute; 2002 [cited 2017 Mar 26]. Available from: http://ndri.curtin.edu.au/local/docs/pdf/publications/M38.pdf
18. Gray D, Saggers S, Sputore B, Bourbon D. What works? A review of evaluated alcohol misuse interventions among Aboriginal Australians. *Addiction*. 2000;95(1):11-22.
19. Purdie N, Dudgeon P, Walker R. *Working Together: Aboriginal and Torres Strait Islander Mental Health and Wellbeing Principles and Practice* [Internet]. 2nd ed. Canberra (AUST): Government of Australia; 2014 [cited 2017 Jul 1]. Available from: https://www.telethonkids.org.au/globalassets/media/documents/aboriginal-health/working-together-second-edition/working-together-aboriginal-and-wellbeing-2014.pdf
20. Wilson M, Stearne A, Gray D, Saggers S. *Review of the Harmful Use of Alcohol amongst Indigenous Australians* [Internet]. Mt Lawley (AUST): Edith Cowan University Australian Indigenous HealthInfoNet; 2010 [cited 2017 Mar 29]. Available from: www.healthinfonet.ecu.edu.au/uploads/docs/alcohol-review.pdf
21. MacLean SJ, d'Abbs PH. Petrol Sniffing in Aboriginal communities: A review of interventions. *Drug Alcohol Rev*. 2002;21(1):65-72.
22. d'Abbs PH, MacLean SJ. *Petrol Sniffing in Aboriginal Communities: A Review of Interventions* [Internet]. Presentation at the Select Committee on Substance Abuse in the Community; 2002. Darwin (AUST): Legislative Assembly of The Northern Territory; 2004 [cited 2017 Mar 30]. Available from: https://parliament.nt.gov.au/__data/assets/pdf_file/0008/367865/Petrol-Sniffing-Report-FINAL.pdf
23. Bohanna I, Bird K, Copeland J, Roberts N, Clough A. A service-level action research intervention to improve identification and treatment of cannabis and related mental health issues in young Indigenous Australians: A study protocol. *BMJ Open*. 2014;4(7):e005689.
24. MacLean S, Cameron J, Harney A, Lee N. Psychosocial therapeutic interventions for volatile substance use: A systematic review. *Addiction*. 2012;107(2):278-88.
25. McCalman J, Tsey K, Weniton M, et al. *A Literature Review for Indigenous Men's Groups* [Internet]. Cairns (AUST): James Cook University; 2006 [cited 2017 Mar 30]. https://researchonline.jcu.edu.au/10647/1/10647_McCalman_et_al_2006.pdf
26. McCalman J, Tsey K, Bainbridge R, Shakeshaft A, et al. Tailoring a response to youth binge drinking in an Aboriginal Australian Community: A grounded theory study. *BMC Public Health*. 2013;13(726):1-9.

27. Polsen M, Chiauzzi,A. Volatile substance use in Mount Isa: Community solutions to a community identified issue [Internet]. *Proceedings of the Australian Institute of Criminology 2003 Inhalant Use and Disorder Conference*; 2003 Jul 7-8; Townsville, Australia; 2003. [cited 2017 Mar 24]. Available from: http://www.aic.gov.au/media_library/conferences/2003-inhalant/polsen.pdf
28. Taylor K, Thompson S, Davis R. Delivering culturally appropriate residential rehabilitation for urban Indigenous Australians. *Aust N Z J Public Health*. 2010;34(S1):36-40.
29. Pembroke F, Dinan-Thompson M, Sellwood J. A kickstart to life for Indigenous youth. *Proceedings of the Australian Association for Research in Education (AARE) 2004 Annual Conference* [Internet]; 2004 Nov-Dec; Melbourne, Australia; 2004 [cited 2017 Jul 2]. Available from: https://www.aare.edu.au/data/publications/2004/sel04253.pdf
30. Trees K. Mobile media: Communicating with and by Indigenous youth about alcohol. *Aust Aboriginal Stud.* 2015(1):97-106.
31. Mohajer N, Bessarab D, Earnest J. There should be more help out here! A qualitative study of the needs of Aboriginal adolescents in rural Australia. *Rural Remote Health*. 2009;9(1137):1-11.
32. Calabria B, Clifford A, Rose M, Shakeshaft A. Tailoring a family-based alcohol intervention for Aboriginal Australians, and the experiences and perceptions of health care providers trained in its delivery. *BMC Public Health*. 2014;14(1):1-10
33. Preuss K, Napanangka Brown J. Stopping petrol sniffing in remote Aboriginal Australia: Key elements of the Mt Theo Program. *Drug Alcohol Rev*. 2006;25(3):189-93.
34. Hart LM, Bourchier SJ, Jorm AF. Development of mental health first aid guidelines for Aboriginal and Torres Strait Islander people experiencing problems with substance use: A Delphi study. *BMC Psychiatry*. 2010;10(78):1-10.
35. Thomson N. *Translational Research and the Australian Indigenous HealthInfoNet*. Working Paper May 2012. Mt Lawley (AUST): Edith Cowan University Australian Indigenous HealthInfoNet; 2012.
36. National Health and Medical Research Council. *How to Use the Evidence: Assessment and Application of Scientific Evidence* [Internet]. Canberra (AUST): Government of Australia; 2000 [cited 2017 Mar 29]. Available from: https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/cp69.pdf
37. Burns C, Currie B, Clough A, Wuridjal R. Evaluation of strategies used by a remote Aboriginal community to eliminate petrol sniffing. *Med J Aust*. 1995;163:82-6.
38. Australian Government Department of Health. *Australian Indigenous Alcohol and Other Drugs Knowledge Centre* [Internet]. Mt Lawley (AUST): Edith Cowan University Australian Indigenous HealthInfoNet; 2017 [cited 2017 Nov 1]. Available from: http://www.aodknowledgecentre.net.au
39. Wilkinson R, Marmot M. *Social Determinants of Health: The Solid Facts*. Geneva (CHE): World Health Organization; 2003.